SECTION 1.4 MITIGATION MEASURES
(WAC 463-42-085)

1.4.1 INTRODUCTION

The following describes measures which are proposed either as part of the Cross Cascade Pipeline project design or as potential mitigation to minimize possible adverse impacts on the physical or human environment. The measures are described by element of the environment. More detailed information on existing conditions, potential impacts and proposed mitigation measures are included in Section 2.9 Spill Prevention and Control, 2.10 Surface-Water Runoff, and Parts 3, 4, 5, 6, and 8 of this application.

1.4.2 GENERAL CONSTRUCTION MITIGATION PRACTICES

The following mitigation measures consist of Best Management Practices (BMPs) which will be applied to construction of the proposed facilities.

1.4.2.1 Erosion and Sediment Control BMPs

Construction progress and specific work activities are subject to the effects of terrain, topography, subsurface conditions, right-of-way width, and weather. It is not possible to predict exactly the time between initial right-of-way clearing and revegetation for any given corridor segment. However, the interval is usually one week or less based on experience with other pipeline projects. The following measures will be implemented to ensure that the interval is kept to the minimum amount necessary:

- Right-of-way clearing will be restricted to no more than three (3) days worth of the average construction progress across the existing terrain.
- Opening of the ditch or trench will be restricted to no more than two (2) days worth of the average construction progress.
- Unfinished right-of-way reclamation will be restricted to one week's worth of progress. Any right-of-way which cannot be reclaimed and revegetated within one week of the pipe laying and weld examinations will be treated to prevent or minimize erosion by maintaining the erosion control facilities and, where appropriate, by covering the right-of-way with mulch.

Construction practices will conform with the erosion control and sediment BMPs as set forth in the Stormwater Management Manual. The 13 general requirements for site erosion and sediment control are listed below and will be implemented as necessary.

- **Soil stabilization:** Exposed and unworked soils will be stabilized to protect soils from rain and flowing water. This includes such practices as vegetative cover, mulching, or the early

application of a gravel base.

- **Site easement:** The limits of the construction area will be clearly marked, including the marking of any sensitive areas, buffers, trees and other vegetation to be retained and water courses.
- **Adjacent properties:** Adjacent properties will be protected from sediment deposition. This includes providing some type of barrier between the construction zone and adjacent properties which can include a natural vegetative buffer.
- **Timing:** One of the first steps of construction will be the construction of sediment control structures such as sediment traps and barriers. When feasible, these features will be in place prior to clearing of the area.
- **Slopes:** Cut and fill slopes will be designed and constructed to minimize erosion. Exposed slopes will be stabilized to prevent erosion. Stockpiles of erodible raw materials will be covered and bermed to prevent stormwater from entering stockpiles. If piles are so large that they cannot be feasibly covered and contained, erosion control practices will be implemented at perimeter of site and temporary sediment traps will be used to offsite movement.
- **Down gradient control:** Offsite erosion will be controlled. In addition to Item #2 above, measures will be implemented for additional protection of downstream or downgradient properties or watersheds.
- **Conveyance channels:** If required, temporary conveyance channels will be designed, constructed and stabilized to prevent erosion from the expected velocity of flow from a 25-year, 24-hour frequency storm.
- **Storm drains:** If storm drain outlets are constructed, they will be protected so that stormwater runoff will not enter offsite stormwater systems without first being filtered or otherwise treated to remove sediment.
- **Utilities:** If underground utility construction is required, lengths open will be limited to 500' at any one time; excavated material will be placed on the uphill side of the excavation, and trench dewatering will be directed into a sediment trap.
- **Site access roads:** Provisions will be made to minimize the transport of sediment onto paved road surfaces. If sediment is transported onto roads it will be cleaned up at the end of each day.
- **Removal of BMPs:** All temporary erosion and sediment control measures will be removed within 30 days after the site's use as a construction staging area has ended and stabilization measures are in place and operating according to performance standards, unless there is a continuing need for the site for another project.
- **Dewatering:** In any area that has dewatering devices from exposed surfaces, the discharge will be directed into a sediment trap or some other type of filter system.
- **Pollutant control:** All other potential pollutants that occur or are used on site during construction (such as petroleum products) will be handled and disposed of in a manner which does not contaminate stormwater.

See Section 2.10 Stormwater Runoff, for a detailed discussion of the specific application of erosion and sediment control BMPs. A detailed, site-specific erosion and sediment control plan will be submitted to EFSEC prior to construction.

1.4.2.2 Construction at Water Crossings

- Secondary containment structures will be constructed (i.e. berms and filter fences) along with runoff dispersion and sediment traps to prevent any runoff generated in the staging areas from reaching the stream.
- Equipment will not be run into the stream channels such that stream bank and bed integrity is maintained.
- If a temporary stream crossing structure for equipment is needed, an appropriate structure will be designed and constructed prior to pipeline construction (see Section 2.14).
- The pipeline will be laid with a minimum of 2 feet of cover below scour depth.
- Stream waters will be diverted past the construction areas using temporary conveyance structures such as flume pipes, pumps, or coffer dams. The stream diversion will be designed and operated such that it does not cause erosion and scour of the stream channel and will be screened to preclude fish entry.
- Excavating will be conducted to avoid cave-ins and sloughing of the trench sides and river banks.
- The original gradient of the stream will be maintained following backfill and no spoils banks or other objects will be left in the channel.
- All areas disturbed by the construction will be stabilized by mulching, reseeding, or rip-rap placement, and excess spoils will be disposed of such that they do not re-enter the stream.

1.4.2.3 Directional Drilling

Directional drilling will be conducted at the Columbia River crossing.

- The setback distance on both banks of the Columbia River exceed the recommended 100' for potential flooding and erosion potential.
- Concentrated flows of water will be diverted from the drilling location by using sandbags, or other check dams.
- Temporary sediment traps may be used to catch sediments generated during the drilling.
- Soil cuttings and accumulated sediment will be disposed of by appropriate methods and exposed soils will be stabilized at the end of the job using mulch or other erosion control methods.
- Typical drilling fluid will be a bentonite water mix (e.g., 10 to 12 gallons/pound) and may contain additives as appropriate. Oil based fluids will not be used.

- All drilling fluids will be contained in basins which will be designed to hold all of the circulating fluids and which will be excavated on both sides of the crossing. In no situation will fluids be allowed to discharge from the basins or the surface of the drill site to any stream.

1.4.2.4 Road Crossings or Entrances

- Rock mats will be placed at entrances/exits to each site to minimize the amount of sediment accumulation on public roadways.
- Any sediment deposited on paved roads will be removed daily.
- Sediment will not be washed into existing catch basins.

1.4.2.5 Construction on Steep Slopes

- Check structures such as dikes and swales will be used to reduce runoff velocity on disturbed slopes and to divert surface runoff around and away from steep slopes.
- Dikes and swales may be constructed at the base, top, or horizontally across slopes as needed and the runoff will be diverted to a sediment trap.
- In areas with moderate to high erosion potential, filter fences, or a combination of filter fences and straw bales, will be installed to prevent sediment eroded from steep slopes and disturbed areas from entering a water body or leaving the construction site.
- Matting or netting may be used on steep slopes to prevent erosion.
- Mulching and prompt revegetation will be used to minimize erosion of exposed soils.
- Temporary diversions will remain in place until the slope is re-stabilized.

1.4.2.6 Permanent Stabilization at Pump Station Sites

- Immediately following construction at each site, the site will be revegetated using native, non-invasive plant species, or hydroseeded (where appropriate) using a grass and forb mixture recommended by the Natural Resources Conservation Service and the Washington Department of Fish and Wildlife.
- Access areas and areas surrounding control buildings may be graveled, depending on site conditions.

1.4.2.7 Stormwater Pollution Prevention

- Any stormwater runoff on site will be directed to sediment basin and allowed to evaporate.
- The containment structure will allow for infiltration and evaporation of the stored water.
- The detention basin will be sized appropriately to a minimum 25 year event, allowing for losses from infiltration.

- All erosion and sediment control BMPs will be inspected and maintained prior to and after major storms and on a routine basis. Control structures, if any are required, will be checked immediately following major rain events, any debris removed, and repairs made promptly.
- Appropriate storage areas for liquid chemicals (including pesticides and fertilizers), waste oils, solvents, or petroleum products will be maintained in designated locations at least 100' away from all water bodies and drainage ways. The storage areas will be placed on concrete or asphalt pads (impermeable) and will include secondary containment in the event of a leak or spill. The secondary containment will be sized such that all potentially leaked stored materials will be collected.
- Chemicals will be properly labeled and tight-fitting lids will be maintained on all containers.
- Containers will be raised off the ground on pallets or the storage area will be bermed to prevent stormwater from contacting the containers. Storage areas will be covered where feasible. Drip pans or equivalent adsorbent materials will be placed at potential drip/spill locations during filling or unloading of containers and containers will be checked daily for leaks and spills. Any containers that are deteriorating will be immediately replaced.
- Spill cleanup materials will be stored and maintained on site in case of accidental release and employees will be trained in spill control procedures.
- Fertilizers generally will not be applied to areas immediately adjacent to water bodies or drainage pathways. If fertilizer is necessary near water bodies, fertilizer with little or no phosphorous will be selected if available. Local authorities will be consulted before applying fertilizer near any sensitive water body.

See Section 2.10 Stormwater Runoff, for further discussion of stormwater management and pollution prevention. A Stormwater Pollution Prevention plan will be submitted to EFSEC prior to construction.

1.4.3 PROTECTION FROM NATURAL HAZARDS

1.4.3.1 Protection Measures Against Fault Rupture

- Avoidance has been selected as the most effective mitigation measure against damage due to fault rupture.
- The pipeline will be constructed of welded high-grade steel which allows a significant amount of movement of the pipeline during ground displacement without rupturing the pipeline.
- To further take advantage of the ductility capacity of the pipe, the trench geometry can be altered if necessary.
- Depending of the length of pipe impacted, a soil-pipe interaction analysis will evaluate induced stresses and strains for various backfill configurations. Based on the analysis

results, combinations of pipe wall thickness, backfill compaction and trench geometry can be evaluated that will accommodate the expected displacement thereby protecting the pipe from damage.

- Alternatively, an active mitigation measure is to place block valves on both sides of the fault.
- The pipeline corridor has been located to avoid the portion of the Saddle Mountains fault with documented recent activity.
- The pipeline alignment may cross the buried eastern extension of the Saddle Mountains fault which is inferred to be present beneath the anticline crossed by the route. During trenching for construction of this portion of the pipeline, the trench will be inspected for evidence of the fault or deformed soils by a qualified geologist.
- If necessary trench alterations as described above will be implemented.

1.4.3.2 Protection Measures Against Liquefaction

Mitigation measures will consider the degree of hazard, the soil and groundwater conditions at the site, the topography of the site relative to the pipe orientation, constructability issues, and other factors. Examples of accepted construction practices that would be considered to mitigate the impact due to liquefaction are provided below.

- **Buoyancy compensation**: In areas where liquefaction is possible but lateral spreading is not a significant concern, the pipeline can be weighted with river weights to achieve negative buoyancy. Alternatively, the pipeline can also be encased in concrete, achieving the same effect. Typically, enough weight is added to assure that the pipe will not float if the surrounding soil liquefies. The area the pipeline traverses across the Snoqualmie River Valley is a flood plain and the pipeline will be encased in concrete or weighted with river weights as a measure to prevent buoyancy of the pipeline should liquefaction occur.
- **Deep burial**: The pipeline can be installed in non-liquefiable deposits that underlie loose surficial deposits. Increased burial depth will isolate the pipeline from potential displacement of the susceptible overlying layers.
- **Above-grade support**: Where the depth of potential liquefaction exceeds the practical pipe burial depth, it may be feasible to lay the pipe on saddles supported by piles or piers designed to resist lateral loads. Typical pier designs consist of 24 to 36 inch diameter reinforced concrete piers with restraining saddles supporting the pipe. The piers would extend into non-liquefiable soils at depth and would have adequate capacity to resist lateral loads and allow liquefied soils to flow beneath the pipe.
- **Removal and replacement**: Liquefiable materials surrounding the pipe can be removed and replaced with compacted fill. The extent of replacement will be determined based on site conditions, but will generally extend several feet to each side of the alignment and down to non-liquefiable soils.

- **In-situ densification**: Potentially liquefiable soils can be densified in place where the depth of the susceptible layer exceeds practical excavation depths. In-place densification methods include vibroreplacement (stone columns), heavy tamping, grouting, and other variations. The method, extent, and depth of in-place densification will depend on site topography and soil composition.

1.4.3.3 Protection Measures Against Volcanic Activity

Direct or indirect effects of volcanic activity from Cascade Range volcanoes are not anticipated to adversely impact the proposed pipeline, pump stations, and terminals. Therefore no specific protective measure are planned.

- In the event of a volcanic eruption, protective measures against ash fall would not be necessary during the operation of the pipeline. During the eruptions of Mount St. Helens, fuel deliveries to Portland on the existing OPL mainline in western Washington were not interrupted.
- As a good engineering practice, the proposed pump station facilities along the pipeline will be equipped with air filtration systems. In the event that ash fallout from a volcanic eruption reaches the pipeline facilities and begins to adversely impact operations, the pipeline system would be shut down until safe operating conditions return. If an eruption occurred during construction, a temporary shut-down would most likely be required to protect equipment and human health.

1.4.4 SPILL PREVENTION

1.4.4.1 Release Prevention Methods

The following pipeline release prevention methods will be incorporated into the engineering design of the proposed Cross Cascade pipeline system.

- Check and gate valves to control back flow in the event of a release.
- Pressure relieving valves will be installed at appropriate locations to avoid pressure build-up.
- Regular maintenance will be conducted.
- All valves, pipes, and fittings will be maintained at a working pressure suitable to the design requirements of the system.
- Cathodic protection will be installed and maintained.
- Line markers will clearly define pipeline right-of-way crossings of roads, rivers and streams.
- Work by third parties along the right-of-way will be monitored.

- All of the pipeline will be subject to periodic (minimum of every 5 years) inspections via an internal inspection tool (smart pig).

Block valves will be located at pump stations and at crossings of large rivers or streams that have a large number of water withdrawals.

1.4.4.2 Spill Prevention, Control and Countermeasure (SPCC) Plan

- OPL will prepare a separate SPCC plan for the required facilities of the proposed Cross Cascade Pipeline. The SPCC plans will be for the proposed pump stations at Thrasher, North Bend, and Kittitas, including the storage facilities at Kittitas. As new pump stations are constructed (Stampede, Beverly-Burke, and Othello), the plan will be amended to cover those facilities. The plan will also be updated as new storage tanks are constructed at the proposed Kittitas Terminal. The plan will be submitted no later than 65 days prior to the operation of the proposed facilities.
- The pipeline will be a welded steel pipeline, operated at ambient temperatures, and protected from corrosion by an impressed current cathodic protection system and coating.

1.4.4.3 Continuous Monitoring

- OPL personnel will continuously (24 hours per day) monitor operational performance and integrity throughout pipeline operations and terminal transfers.
- Monitoring will be performed through visual inspections and analysis of pipeline operational conditions, such as line pressures, flow volumes, and pump and valve actuation.
- Tank levels and operation conditions at the Kittitas Terminal will also be continuously monitored remotely from the Renton Control Center and visually by facility personnel during normal operating hours.
- The Renton Control Center will have the capability of remotely controlling pumps and valves and monitoring the pressures and flow volumes along the entire length of the proposed pipeline.
- If abnormal operating conditions occur during pipeline operation, audible and visual alarms will activate, and an investigation will be initiated by system controllers to determine the source of the abnormal condition.

1.4.4.4 Kittitas Terminal Operating Conditions

The Kittitas Terminal will be equipped with both terminal lockout and shutdown devices and/or procedures that will result in a lockout or shutdown.

Terminal and delivery facility lockout will be activated when any one of the following conditions occur.

- Local initiation of the terminal lockout button from the local control panel or emergency lockout button from any pole position in the terminal yard. When the lockout or emergency lockout button is activated, the entire terminal complex will be locked out. Alarms at both the local control panel and the Renton operations control panel will be activated.
- High-high sump tank level. The terminal and delivery shutdown occurs when the sump high-high level monitor is activated. Alarms at both the local and Renton control centers are activated.
- Relief line flow will lockout the terminal and delivery shutdown occurs. Alarms are triggered at the local and Renton operations control panel.
- Devices will be installed to detect when ultraviolet radiation exceeds the maximum allowable for a specified time, indicating possible fire conditions. Alarms are activated at both the local and Renton operations control panels.
- Foam sprinkler systems will be installed that, when activated, also trigger alarm systems in both the local and Renton control panels. In addition, OPL will coordinate with the local fire departments (Kittitas and Ellensburg) to determine the appropriate alarm and notification systems for their needs.
- All storage tanks will be equipped with both a high-level monitor that activates delivery facility lockout and shutdown. The monitor/annunciator also activates alarms at the local and Renton control panels.

1.4.4.5 Supervisory Control and Data Acquisition (SCADA)

Detection and estimation of release volumes is achieved through the use of Supervisory Control and Data Acquisition (SCADA) software, field hardware, and the experience of the Renton Control Center Operations Controllers. The combination of hardware and software tools provides the operations controllers with significant detection capabilities.

A fundamental leak detection capability of SCADA that alerts operation controllers of possible problems is the over/short subsystem. The surveillance functions include over/short volume calculations based upon:

- Net volumes from metered injection and receiving points
- Net volumes calculated from tank level readings
- Net line segment inventory changes

The sensitivity of model compensated volume balance leak detection is influenced by a number of factors including the instrumentation, communications, and computer systems associated with the pipeline; the

physical conditions present at the site of the event, and the manner in which the event develops. The instrumentation, communications, and computer system technology that will be employed for the new pipeline is designed to detect leaks of less than one percent (1%) of average pipeline flowrate. It is important to recognize that an integral component of the leak detection system is Olympic's operational monitoring program. This program includes over-flights of the route approximately every two weeks, periodic inspection of facilities by field personnel, and landowner education. These activities are designed to identify product losses which are below the threshold that is detectable through the technology.

1.4.4.6 Safety Devices

- The OPL operating system has safety devices installed to protect pipeline facilities and prevent injury to persons, property, and the environment.
- Generally, these alarms will require or result in shutdown of some portion of the pipeline system. In the event of a station lockout, field employees will be sent to investigate and correct the condition.
- The shutdown portion of the system will not be restarted until the designated field employee notifies the Renton Control Center Operations Controller that an abnormal condition does not exist and the system may resume operation.

1.4.4.7 Visual Monitoring

In addition to continuous monitoring of operating conditions via the Renton Control Center, visual inspections of the pipeline right-of-way will be performed on a frequent and consistent basis.

- Aerial visual inspection of the entire length of the pipeline is performed at a minimum of 26 times per year (Federal DOT minimum required). OPL policy is to schedule an aerial inspection once a week.
- Pipeline segments are also visually inspected via maintenance personnel during the normal course of work, and routine observations will be made by surface vehicles as they drive along rights-of-way. Abnormal conditions will be noted and responded to immediately.
- If abnormal conditions are noted by the Renton Control Center, field personnel are directed to the affected area(s) to visually assess the situation.

1.4.4.8 Reports From Outside Sources

Conditions which may indicate that a release has occurred, may be reported by noncompany personnel.

- The conditions will be responded to by facility personnel closest to the reported release.
- Signs will be posted on the perimeter fences of facilities (pump stations and block valves) with a 24-hour telephone number to call in the event of an emergency.
- The OPL 24-hour telephone number is also printed on right-of-way signs at highway and

water crossings, on milepost markers, and along the right-of-way.

1.4.5 EARTH

1.4.5.1 Construction

Site-specific geotechnical engineering evaluations will be conducted prior to design of the facility to identify design methods to address the potential impacts presented above. In addition, the following mitigation measures will be included:

- All of the excavations in high hazard prone areas mapped as high hazard to erosion and/or mass wasting (based on mapping completed for the preparation of the application) will be monitored by a geologist or engineer during construction to verify proper excavation methods for the soils and/or rock encountered. Blasting of the bedrock will be conducted by experienced blasting personnel who will control overblasting.
- Dry unlined irrigation canals are proposed to be open trenched.
- Wet, unlined canals, depending on the flow volume, are proposed to be either jack-and-bored under, or the water will be diverted and the canal trenched. Wet, lined canals are proposed to be bored under. All repairs to irrigation canals will be done in accordance with the Reclamation District repair specifications.
- Activities at bored crossings will be restricted to the expanded right-of-way described in the application. The right-of-way will be re-vegetated and reclaimed as per provisions in the application and with stipulated agreements with intervening agencies.
- The placement of fill consisting of moisture-sensitive soils will be limited to the drier months between July and October. If the construction schedule requires backfilling during other periods, additional mitigation measures will be used. The fill placement will be monitored during construction by a geologist or engineer to verify proper compaction of the fill soils.
- The contractor will be allowed to work in wet weather provided that the contractor is able to demonstrate the capability of construction at the same level of quality control as during dry weather and as established by on site inspection personnel. The contractor will need to demonstrate a safe work environment while subscribing to all provisions of the project specifications, the various stipulated agreements and the erosion control provisions in particular.
- The banks of streams will be protected after disturbance to limit post-installation erosion.
- Permanent slope stabilization measures and/or dewatering systems will be utilized as necessary during the pipeline installation to minimize slope instabilities. Two areas where these measures are likely are the south slopes of Cherry Creek and Tolt River crossings.
- The directional drilling operations will be monitored to minimize adverse impacts during the construction of the staging areas, as well as the drilling. An erosion control plan will

be completed and implemented to minimize erosion.

- In steep, rock-walled slopes, protection such as rock nets and safety benches will be incorporated in the final design of the pipeline to protect workers, equipment, and the pipeline from damage or injury from rockfall. A construction plan will be completed and implemented to limit impacts.
- In the areas where saturated liquefiable soils have been identified, if the depth to non-liquefiable soils is not too great, over-excavation and replacement with non-liquefiable soils may be used as a mitigation measure.
- To mitigate potential seismic impact to the pipeline, the final design will incorporate measures to enable the pipeline to reasonably withstand anticipated ground motion.

1.4.5.2 Operation

- Potential geologic hazard areas will be further mapped as part of the "as built" survey and these areas will be visually inspected as part of the routine inspection program.
- A schedule of visual inspection will be instituted which will be used during increased precipitation or following abnormal seismic activity. These inspections will look for signs of incipient mass movement in those areas identified as potentially susceptible to such failures.
- Potential mitigation measures for mass movement include installation of the pipe with its longitudinal axis parallel to the direction of potential ground movement; anchoring the pipe to stable underlying rock; or installation of ground motion or pipe stress sensors, if feasible.

1.4.6 AIR

The mitigation measures for air emissions during operation are included within the designs of the pump stations, Kittitas Terminal and Pasco delivery facilities. There are no additional mitigation measures proposed for the Kittitas Terminal or for the pipeline operations concerning air emissions other than what is included in the design. Best Available Control Technology (BACT) will be employed to mitigate impacts to air quality. The Kittitas Terminal will comply with New Source Performance Standards (NSPS), including inspection and maintenance of the tank roofs, seals, and vents. Routine inspection and maintenance is included in the Operations and Maintenance Plans for the facility.

Truck loading operations will incorporate the following mitigation measures:

- The truck rack will have dry break couplings on the loading arms eliminating product spills and vapor loss when decoupling the arms from the trucks.
- The trucks will be submerged filled using bottom loading which also reduces vapor loss. A vapor recovery system will be employed during the loading operations as well.

- Trucks will be leak tested and vapor-tight, considerably reducing emissions which may be lost during loading and transit. Records will be maintained on site of all tanks and leak testing.

Mitigation measures for dust control during construction will consist of:

- Watering the right of way periodically as necessary.
- Applying gravel to access roads where traffic volume is high and where the road surface will need improvement.
- Curtailing construction activities when high winds are contributing to excessive dust.
- Reducing speed limits on the right of way during construction to 10 mph.

1.4.7 WATER

The primary means to minimize impacts during both construction and operation of the project is to follow BMPs as outlined in Section 2.10 for surface water and erosion control, and to use the appropriate stream crossing construction trenching method as field conditions warrant (See Section 2.14 Construction Methodology).

Effective application of drainage and erosion control BMPs during construction, and appropriate construction methods will result in minimal impacts. The key mitigation strategy and BMPs that will insure minimal impacts are the following:

- Minimizing the amount of disturbance.
- Seasonal construction phasing, thus avoiding time periods when significant erosion can occur.
- Effective monitoring of BMPs during construction to detect problems before they become significant, especially at the most sensitive crossings, followed by appropriate actions to modify the BMPs if monitoring indicates that problems are developing.

The key design and construction features and post-construction BMPs and activities which will insure minimal impacts during operation include the following:

- Adequate pipeline burial depth and width at each crossing, considering the full active channel width and active downcutting of the bed in incised channels.
- Stream bank and bed stabilization after construction.
- Aggressive slope stabilization and re-vegetation after construction.
- Inclusion of block valves at spacings sufficient to prevent large petroleum products releases, placement of trench plugs in the pipeline trench on each bank of a crossing (to prevent leakage from entering a stream via the trench fill).

- Effective long term monitoring of erosion conditions to prevent potential pipeline exposure.
- Effective corrosion protection at crossings (and in areas of shallow ground water) to preserve the integrity of the pipeline.
- Effective long term monitoring for leaks and spills to provide adequate lead time for prevention and cleanup actions.

1.4.7.1 Surface Water

The impacts of the pipeline system will affect approximately 78 wetlands and 293 watercourse crossings. The number of streams and rivers which are significantly impacted depends upon the aquatic resources within those watercourses, and in some instances, the location of the crossing on a particular watercourse. The following are mitigative measures designed to address the impacts of various activities at watercourse crossings.

Staging Areas

- Staging areas will be located at least 50' away from streambank where topographic conditions permit.
- The streambed preparation area will typically be 60' by 100' on both sides of the stream crossing.
- No hazardous materials, chemicals, fuels, and lubricating oils will be stored within floodplain.
- All equipment will be refueled at least 100' from the streambank.

Spoil Placement and Control

- The upper 6 to 12" of topsoil will be removed and protected throughout construction with erosion control devices.
- Spoil flow, or runoff of spoil will be prevented from going off of right-of-way.
- All spoil material from water body crossings will be placed in the right of way at least 10' away from the ordinary high water line.
- The materials removed from the trench below the topsoil level may also be stockpiled in adjacent upland areas. However, it will not be placed on top of, or mixed with, the topsoil material previously removed.

Time Windows for Construction

- Construction of stream crossings will occur during low flow periods but prior to anadramous fish migration.

Watercourse Crossing Procedures

- At no time will heavy equipment be allowed directly into the stream or onto the riparian area immediately adjacent to the stream.
- Equipment crossings of sensitive perennial streams will be accomplished with the use of pads with culverts, clean rockfill and culverts, or a portable bridge.
- The crossing through the stream will be reduced to 30' wide or less.
- Stream crossings will be constructed as perpendicular to axis of stream channel as engineering and routing conditions permit.
- Before trench excavation begins, vegetation and topsoil in the riparian zone will be removed and stockpiled for later use.
- Material removed for trench construction will be stockpiled on the ground outside the sensitive area and contained within an earthen berm.
- Once the trench has been excavated, preconstructed lengths of pipe will be pulled through the stream ditch underneath the bypass pipe.
- If the stream width warrants it, concrete coated pipe will be installed to prevent the pipe from floating up through the surface after water is returned to the streambed.
- Clean gravel will be used for upper 1' of fill over backfill trench within stream channels.
- Downstream flow rates will be maintained at all times.
- For crossings of ecologically sensitive fish habitat, streams will be routed across a trench using a flume pipe or pump around system using the "dry ditch" technique.
- Instream construction in minor streams will be completed within 48 hours if possible.
- If blasting is required, fish will be captured and relocated to other appropriate stream areas prior to blasting activities.

Temporary Erosion and Sediment Control

- See Section 2.10 Surface-Water Runoff for a listing of erosion and sediment control devices.
- Temporary erosion and sediment control devices will be inspected daily and repaired as needed.
- Sediment filter devices will be installed and maintained at all streambanks.

Bank Stabilization and Revegetation

- The streambank will be returned to original contour when possible.
- Revegetation will be performed immediately after construction using vegetation that quickly establishes and plant native plants such as willows and alder for long-term stabilization.
- Log deflectors will be used where practicable to create sediment deposition and allow the

reestablishment of vegetation to stabilize banks.

- The use of rip-rap will be limited to areas where flow conditions preempt vegetative stabilization.

Operations

- All river crossings will be restored after construction and will have ongoing maintenance as required to prevent erosion
- Frequent inspections of the pipeline by air will provide detection of any potential problems due to erosion or other construction activity in the area.
- Water crossings will be surveyed for bottom contours to ensure adequate soil depth over the pipeline is maintained.

1.4.7.2 Senior Water Rights

- If a spill should occur of sufficient quantity to impair downstream water use, Olympic Pipe Line will compensate for the impairment according to a plan developed in coordination with state and local authorities, and communities in each WRIA.

1.4.7.3 Runoff and Absorption Mitigation Measures

Minimizing impacts and mitigation for impacts to runoff and absorption resulting from the project construction and operation revolve around the following general BMP and mitigation strategies:

- Adequate drainage and erosion control during construction;
- Minimizing disturbance area;
- Avoiding construction during periods of high precipitation (seasonal construction phasing);
- Adequate re-vegetation and slope stabilization after construction; and
- Effective monitoring of BMPs during construction and spill monitoring during operation.

1.4.7.4 Floods and Floodplains Mitigation Measures

- To minimize potential impacts to the pipeline from flooding, all pipeline facilities and above ground valves will be located outside of floodplain boundaries.
- The pipeline will be buried below maximum scour depth across the full width of the floodplains, and will be encased in concrete pipe to protect against scour and flotation.

1.4.7.5 Groundwater

The project incorporates measures to avoid or minimize harm to groundwater. Erosion control measures

will be used in all areas where soils are exposed to the elements during project construction requiring drainage basins or settling ponds which could become a pathway to groundwater. The measures to minimize potential groundwater contamination will include one or more of the following:

- Clearing and grading will be limited to the minimum necessary for the pipeline construction.
- Surface water will be diverted from all excavations using temporary and permanent runoff diversion structures.
- Sediment retention ponds will be constructed as deemed necessary to prevent siltation of surface of surface water drainages.
- Surface protection techniques such as mulching will be done as necessary.
- Disturbed soils will be graded and seeded after the pipeline construction has been completed.
- Until vegetation is established, settling basins will be maintained to help remove sediments from stormwater runoff before it discharges into natural watercourses.
- To prevent localized impacts to groundwater quality adjacent to and downgradient of excavation, minor spills will be cleaned up by construction crews as part of their operating guidelines.
- In areas where low permeability soils occur at or near the surface, the backfill will be compacted to match the native overlying soils, and if necessary, the bottom of the trench will be lined with a low permeability material.
- The pipeline will utilize cathodic coating and cathodic protection to prevent corrosion. The entire pipeline will be inspected for corrosion on a regular (annual) basis and the most sensitive areas will be inspected more frequently.
- To prevent accidental spills at pump stations from reaching surface or groundwater, OPL provides leak containment is provided at each pump station site. Valves and pump stations will be kept to a minimum in the most sensitive pipeline segments.
- Deeper burials, concrete coating, thicker-walled pipes and cathodic protection to prevent corrosion are measures used to prevent damage to the pipeline.
- To protect existing and senior water right holders, OPL will develop, as part of the project implementation, a compensation plan worked out with the communities, state and local agencies as a WRIA basis to be implemented in the event of an accidental release.
- There will be no block valves located on the pipeline over sole source aquifers except at the Thrasher Pump Station. The pump station will be electronically equipped to detect leaks and leak containment will be provided.
- In sensitive areas, impermeable soils will be employed that will prevent petroleum products from escaping the trench, and will direct the petroleum products toward a lower sensitivity area for capture and clean-up.

- During trenching, there is the possibility of encountering historically contaminated soil as well as buried structures such as wells and underground storage tanks. In these circumstances, proper disposal procedures will be implemented, and the piping will be rerouted to avoid abandoned wells or contaminated soils discovered during the construction process.
- In areas where groundwater conditions could necessitate dewatering in large volumes, rerouting of the pipeline would be considered.

1.4.8 PLANTS AND ANIMALS

1.4.8.1 Upland Vegetation

Mitigation strategies, in order of priority, are: (1) avoidance; (2) minimization; (3) restoration; and (4) compensation.

Avoidance

Avoidance of impacts to upland plant communities has been accomplished in a number of ways. Route alignment and engineering design have resulted in avoiding vegetation impacts along portions of the proposed corridor, most notably in forested plant communities.

Along some segments of the route that are forested, there are logging roads and rail-trails that can be used as a construction corridor. In the forested areas where existing roads and trails are available, specialized construction equipment will be used so that the adjacent forested vegetation will not be cleared (although some overhanging branches may need to be cleared to provide sufficient overhead work space). Given the amount of the route that is forested, this construction technique will significantly reduce the impacts to forested areas.

Construction equipment will use existing access roads to access the construction corridor. Therefore, vegetation will not be removed to access the work areas. By not constructing any new access roads, additional vegetation impacts have been avoided.

In some cases, impacts to priority vegetation habitats (such as oak woodlands and old-growth forest) has been avoided by carefully routing the pipeline around these plant communities.

Where avoidance of upland impacts is not feasible, the following mitigation measures will be used.

Minimization

Impact minimization includes measures taken to reduce the amount of vegetation affected by the

construction of the pipeline as well as measures taken to prevent invasive plant species from becoming established in cleared areas. Impacts will be minimized by utilizing the narrowest construction corridor feasible. The construction corridor will be a maximum of 60' in width (and only 30' wide in stream and wetland buffers). To ensure that vegetation beyond the construction corridor is not unnecessarily removed or crushed by equipment, the pipeline alignment and construction corridor boundaries will be clearly staked and marked to minimize equipment impacts. Temporary fencing will be installed where needed to prevent unanticipated vegetation impacts. Stumps of trees and roots of shrubs will only be removed where absolutely necessary (e.g., where excavation and grading will occur).

Specific measures will be employed to minimize the invasion and spread of undesirable plant species. They include:

- Straw bales will be used instead of hay bales for erosion control to limit the number of weed seeds introduced to disturbed areas.
- Disturbed areas will be replanted with native species after the topsoil has been replaced.
- Trees and shrubs will be replanted in all appropriate disturbed areas outside the maintained corridor to shade out undesirable grasses and weeds.
- Recommendations from the State and County Noxious Weed Control Boards will be used.

In areas that are dominated by non-native and/or invasive species, those species have the potential to return once construction is complete. Measures implemented to reduce the potential for invasive and/or non-native species to become established will focus primarily on those areas that are composed of primarily native vegetation.

Petroleum products spill impacts will be minimized by employing the Spill Prevention Plan prepared for this project.

Recommendations from the County Noxious Weed Control Boards that will be implemented to minimize the spread of noxious weeds include re-vegetating the construction corridor with certified weed-free seeds, pressure washing construction equipment, and working with board representatives to control spread of weeds.

Restoration

Restoration will begin when construction is complete.

- Final grading will include construction of diversion levees across slopes and chiseling or discing compacted soils.
- Areas dominated by forested and scrub-shrub plant communities will be restored within the portion of the construction corridor not maintained as right-of-way.

- All vegetation planted or used in seed mixes will be native to the area. Shrub-steppe habitats will be restored along the entire width of the construction corridor with a mix of shrub and grass seeds that are native to the area. Areas currently composed of herbaceous vegetation will be restored with a seed mix native to the area.
- Cropland and hay/pasture plant communities will be restored.
- Plants will be installed in the ground and seed mixes spread in late summer before the rainy season begins.

Compensation

- Forested areas that will be maintained as part of the permanent right-of-way will be converted to shrub and/or herbaceous plant communities. This will, in part, compensate for the loss of forested areas.
- The permanent loss of existing trees and snags in forested areas will be mitigated by planting trees and placing snags in onsite areas.
- Snags and downed logs will be placed in suitable upland areas, including wetland and stream buffers where they will increase habitat value.
- No offsite compensation is proposed.

1.4.8.2 Monitoring

- A five-year monitoring plan for upland vegetation, including contingency plans, will be developed and implemented. Parameters to be monitored will include the success of replanted vegetation, types and percentage cover of invasive species, damage to remaining vegetation along the corridor, such as blowdown or erosion of topsoil, and unanticipated impacts.

1.4.8.3 Wetlands

For each wetland impacted, specific mitigation measures will be evaluated and developed based on the functions and values of that wetland. These mitigation measures will follow the prioritization of avoidance, minimization, restoration, and compensation described above under the upland vegetation section.

Avoidance

As with other critical habitat areas, such as streams and oak woodlands, wetlands will be avoided where possible along the pipeline route. In particular, high value wetlands that are difficult to replicate will be avoided wherever practicable. Nevertheless, not all wetlands can be avoided, and a total of 17 acres of wetlands will be directly impacted by trenching or open cutting and approximately 1,000 acres of wetlands will be indirectly impacted by the pipeline passing through a portion of the wetland or its associated buffer.

Other than the construction right-of-way, the only access roads which will be used in wetlands are those existing roads that can be used with no modification and no impact on the wetland. All construction equipment will be refueled at least 100' from water bodies or wetland boundaries. All equipment will be cleaned and inspected prior to entering a wetland. Equipment leaking oil or other fluids will not be allowed to enter a wetland.

Following are the wetland mitigation strategies that will be employed if avoidance is not feasible.

Minimization

Access, Staging, and Ancillary Areas

- Wetland boundaries in the construction corridor will be staked and flagged.
- Where wetlands must be crossed, the pipeline will be routed through less sensitive portions of the wetland if it is feasible.
- Pipeline construction impacts to wetlands will be minimized by using the narrowest possible corridor (30') and by constructing during a time of year when the resources (i.e., nesting or migrating waterfowl, water quality sensitive fish) are either not present or less vulnerable.
- The only access roads, other than the construction right of way, which will be used in wetlands are those existing roads that can be used with no modification and no impact on the wetland.
- All construction equipment will be refueled at least 100' from water bodies or wetland boundaries.
- All equipment will be cleaned and inspected prior to entering a wetland. Equipment leaking oil or other fluids will not be allowed to enter a wetland.

Spoil Pile Placement and Control

- The upper 6 to 12" of topsoil will be removed and protected throughout construction. This material may be stockpiled in adjacent upland areas.
- All spoil material from water body crossings must be placed in the right of way at least 10' away from the ordinary high water line. At a minimum, all spoil shall be contained within sediment filter devices.
- The materials removed from the trench below the topsoil level may also be stockpiled in adjacent upland areas. However, it will not be placed on top of, or mixed with, the topsoil material previously removed.
- Along with other temporary erosion and sedimentation controls, filter fencing and straw bales will be used during construction to minimize sedimentation in wetlands and to deter

construction equipment operators from venturing further than absolutely necessary into sensitive areas.

General Construction Procedures

- All activities within the wetland will be kept to the minimum disturbance area possible.
- Construction techniques that minimize the compaction and mixing of wetland soils will be utilized.
- In wetlands and riparian areas, vegetation that must be removed will be cut at ground level, leaving existing root systems intact. The pulling of tree stumps and grading activities will be limited to those that would directly interfere with trenching, pipe installation and backfill.
- Trench plugs will be used as necessary to prevent diversion of water into upland portions of the pipeline trench.
- Grading will not take place within the boundaries of any wetland, and disturbance will be kept to the minimum necessary to safely construct the pipeline.
- Pipe sufficient to cross the wetland will be welded on the right-of-way and radiographed before being carried or pulled into the wetland and lowered into the trench. In long wetland stretches, it may be more feasible to weld up several joints of pipe, carry them into the trench leaving one end at the welding location, weld on additional lengths, pull them into the trench, and repeat this process until the entire wetland length has been crossed.
- If standing water or saturated soils are present, low ground weight construction equipment will be used, or construction will be done using prefabricated equipment mats.
- In the event that matting is necessary, all construction activities will be carried out from the matting. Equipment will not be allowed in the wetland off the mats, at any time. The mats will be inspected prior to placing in the wetland and mats with foreign material will not be used.
- Once the pipe has been laid in the trench, the subsoil will be replaced, followed by the topsoil. Excess material will be spread on the right-of-way outside the wetland boundaries.

Restoration

Many of the wetlands crossed by the proposed pipeline can be restored or partially restored in terms of acreage, functions, and values. Restoration of wetland hydrology is essential to the maintenance of wetland functions and values.

- Where trenching occurs through open water, aquatic bed, emergent, and scrub-shrub wetlands, soils and vegetation will be replaced.
- Where trenching through a wetland may alter the hydroperiod (i.e., excavating through a

layer of till, or altering the topography, soil or sub-basin which supports wetland hydrology), soil, subsoil and/or topographic conditions will be recreated as nearly as possible to restore the existing wetland hydrology.

- Restoration of wetland, buffer, and riparian vegetation presently vegetated with native species is considered successful if the native herbaceous and/or woody cover comprises at least 80 percent of the total cover, and native species diversity is at least 50 percent of the diversity originally found in the wetlands. If revegetation is not successful at the end of the 5-year post-construction monitoring period, the applicant will (in consultation with a professional wetlands ecologist, EFSEC, WDFW, and DOE) develop and implement a plan to actively revegetate the wetland with native wetland herbaceous and woody plant species.

Compensation

Impacts to water quality and disruption of wildlife habitat during construction will be, for the most part, temporary in nature. Removal of forested wetland and buffer vegetation will have long term impacts, as will the permanent loss of any other wetland functions and values.

- Compensation for permanent impacts to wetland native plant communities and fish and wildlife habitat values will be negotiated with landowners and natural resource agencies.
- Specific mitigation plans, including monitoring, will be developed for each wetland or buffer loss to be compensated, with the goal of no net loss of wetland acreage, values and functions.

For wetlands that are disturbed but not lost, the following shall apply:

- Forested wetlands. Disturbance impacts to forested wetlands will be mitigated by both: restoration of the disturbed area to either forested wetland or scrub/shrub wetland; and enhancement of disturbed emergent herbaceous wetland to forested wetland in an amount equal to twice the disturbed area.
- Scrub/shrub wetlands. Disturbance impacts to scrub/shrub wetlands will be mitigated by both: restoration of the disturbed area to scrub/shrub wetland; and enhancement of disturbed emergent wetland to scrub/shrub wetland in an amount equal to the disturbed area.
- Emergent wetlands. Disturbance impacts to emergent herbaceous wetlands will be mitigated by restoration of the disturbed areas to native emergent herbaceous wetland and enhancement of disturbed wetland in an amount equal to one-half the disturbed area.
- For those restoration, creation or enhancement areas that do not meet the success standards provided above after 5 years, additional replacement will be provided as follows: an amount of forested wetland equal to the unsuccessful portion of the restored forested

wetland areas; and an amount of scrub/shrub or emergent wetland equal to the unsuccessful portion of the mitigation scrub/shrub or emergent wetland areas.

- Wetland restoration, creation, and enhancement will be designed to meet the goal of no net loss of wetland acreage and functions. In-kind replacement of functions and values will be preferred over out-of-kind replacement.

1.4.8.4 Monitoring

- A five-year post-construction monitoring plan will be developed and implemented to assess mitigation success or failure.
- Wetlands and other sensitive habitats will be monitored during construction to provide oversight to ensure the implementation of Best Management Practices and for onsite adjustments to construction practices.
- Restoration of wetland, buffer, and riparian vegetation presently vegetated with native species is considered successful if the native herbaceous and/or woody cover is at least 80 percent of the total cover, and native species diversity is at least 50 percent of the diversity originally found in the wetlands. If revegetation is not successful at the end of the 5 year post-construction monitoring period, the applicant will develop and implement (in consultation with a professional wetlands ecologist, EFSEC, WDFW, and WDOE) a plan to actively revegetate the wetland with native wetland herbaceous and woody plant species.

1.4.8.5 Right-of-Way Maintenance

- Herbicides and pesticides will not be used.
- No management of vegetation will occur over the right-of-way in wetlands, wetland buffers, and riparian areas.

1.4.8.6 Wildlife

Mitigation measures include route changes and timing restrictions to avoid or minimize most effects along the route. Route changes were made to avoid priority habitats and special status species nesting or foraging areas. In areas where the project location could not be rerouted to avoid sensitive habitat or species, restrictions on timing of construction will be implemented where appropriate.

Impacts can be minimized for four key reasons:

- Underground Location: As the pipeline will be located underground, impacts on most land uses will be temporary.

- Short Construction Period: A pipeline is constructed in sections, thereby minimizing the

time during which any particular area is under construction. For the most sensitive sections along the pipeline route, such as stream crossings, it is expected that construction will be completed within 48 hours. The length of time construction activities will take place in any given location will depend on the location, topography, soils, etc. West of Snoqualmie Pass, construction is expected to move approximately 1.5 to 2.3 miles per day while east of the pass it is expected to move approximately 1.9 to 2.7 miles per day. In the pass area and narrow sections of the route, such as along the JWPT or in BPA corridors, construction time will be approximately 0.3 to 0.5 mile per day.

- Sensitive Areas Avoided: The proposed pipeline route has been adjusted to take into consideration sensitive areas and to avoid them as much as possible. In its 231-mile length, over 99 percent of the corridor has been routed to avoid wetlands. The 17.07 acres that cannot be avoided will be restored or replaced. In addition, by placing the pipeline in existing right-of-way corridors, pipeline impacts are generally confined to areas that already have been disturbed.

- Rivers, Streams, and Canals: The proposed pipeline will cross 294 waterways, most of which are small streams, many of them intermittent. Wherever practicable, existing bridges will be used to cross wetlands and streams.

Preconstruction Mitigation

Mitigation measures applied prior to construction activities include measures intended to lessen impacts to species and habitat in the project area. Specific mitigation measures were formulated for vegetation and wildlife species, although many of these measures apply to both species and habitats. Mitigation measures developed for certain special status species or priority habitats are covered in 3.4.5.2.

Preconstruction mitigation measures include:

- Consolidated the pipeline route to a single corridor along roads, railroads, and in existing rights-of-way to lessen impact from habitat fragmentation.

- New corridors were located along the periphery of forested areas whenever possible to lessen impacts to interior forest species and reduce impacts from edge effects.

- New corridors through forested areas will be restricted to 30' wide or less in the Alice Creek and Humpback Creek areas.

- The new corridor from Tinkham Road to the upper trail road near the Annette lake Trailhead area will be curved to limit straight line-of-sight.

- State and federal wildlife agencies will be contacted periodically for possible additions of any endangered, threatened, or sensitive wildlife species, or priority habitats of statewide significance in the vicinity of the proposed project. If any are identified, coordination for any possible mitigation measures will occur with the appropriate agency.

Construction Mitigation

Construction activities will generally occur from June to October in critical wildlife areas. More specific timing restrictions will occur along the route where any special status species occur within the project area.

Mitigation measures to further reduce impacts will include the following:

- Full-time Environmental Inspector: In order to minimize impacts during construction, and to ensure that environmental protection is given a high priority, OPL will have a full-time environmental compliance coordinator during project construction. This coordinator will oversee qualified personnel working with construction crews to ensure environmental "best management practices" are carried out.
- Directional drilling will be used for crossing the Columbia River. Directional drilling is a method by which the pipeline is buried far beneath the river bottom. By using this method, neither the drill, nor the pipe itself, comes into contact with the river water.
- Other major river crossings will use an open-cut dry method which diverts the water flow in sections of the river for placement of pipe sections. This method can be accomplished in a very short period of time and eliminates the need for a large drilling equipment staging area.
- Confining Pipeline to Existing Corridors Minimizes Impact on Wildlife and Plants: The pipeline will use existing right-of-way corridors whenever possible. These corridors already have experienced significant alterations to vegetation and habitat. Edge and corridor habitat have been created over the years, meaning that wildlife have adjusted to altered habitat conditions.
- Any habitat disruption will occur on a temporary basis during construction. Concentrated construction activity will take place for up to a two-week period in any given location. Disturbed areas will be restored.
- Construction of the pipeline in some limited areas will require the minimal cutting of trees. However, no old-growth trees have been identified in areas needing clearing. New rights-of-way will be created in areas where the proposed route must cross from one existing right-of-way to another. It will also be created where power lines in the existing right-of-way are strung from one slope to another, where shrub vegetation below the power line is currently re-established.

- Following construction, a 30' wide corridor is normally desired for long-term right-of-way maintenance. Thirty feet of the construction easement will be restored and revegetated with native plant species favorable to wildlife immediately following construction, consistent with a site-specific vegetation plan and landowners agreements, as appropriate.
- No access roads will be constructed through sensitive wetland areas and there will be no long-term maintenance right-of-way corridor through wetlands, wetland buffers, and riparian areas, with the exception of limited removal of trees in the wetland buffer.
- Erosion and Sediment Control: Construction contractors will implement an erosion and sediment control plan to include Best Management Practices. These plans and practices will minimize or eliminate potential impacts such as water quality degradation through sedimentation, erosion, and removal of vegetation, and effects on fisheries and aquatic resources.
- Little or No Long-term Noise Impacts: Temporary increases in noise will result from construction of the pipeline. However, most construction will be limited to daytime hours and most areas will experience no more than two weeks of construction activity at any given time.
- Restrictions on blasting will coincide with general timing restrictions for construction.

Noise from operation of the pipeline will be minor. The equipment at the Thrasher, North Bend and Stampede pump stations will be enclosed in buildings to minimize noise. The Kittitas Terminal is adjacent to I-90, where noise levels are already high due to traffic. There are gasoline service stations in the immediate vicinity, but no residences.

- Native vegetation will be retained as much as possible in the impact area to preserve wildlife habitat. Shrub habitat will be maintained at low to medium vegetation heights in the rights-of-way buffers.
- The normal corridor needed during construction will be 60' wide. When a new right-of-way is created in sensitive areas, special construction techniques will be used to restrict it to the smallest area possible.
- In upland forested and riparian areas where new corridors are cut through forest, downed logs will be moved and replaced after construction if the logs and debris are substantial enough to allow replacement.

1.4.8.7 Coordination

- The U.S. Fish and Wildlife Service will be contracted prior to implementation of the project to update the list of endangered, threatened, and candidate species. If there are any new species listed, coordinate any possible mitigation measures with the appropriate agency.
- In consultation with state and federal wildlife agencies, pipeline construction will be

scheduled to avoid critical periods for wildlife, such as bald eagle nesting periods.

- The Washington Department of Fish and Wildlife will be contacted prior to construction for updated information from the Natural Heritage Data Systems.

1.4.8.8 Fisheries and Aquatic Resources

Potential impacts to aquatic resources would be limited to the construction phase of the project. As such, the following mitigation measures pertain to construction. Because only selected trees will be removed from riparian areas, no other mitigation measures are proposed.

General Construction Procedures

- The WDFW will be notified at least 48 hours prior to the commencement of pipe installation activities or blasting within each water body.

Erosion Control

Site specific biotechnical methods of erosion control will be implemented at each waterway crossing. These erosion control methods will include:

- Construction of stream crossings will be limited, to the extent feasible, to the low flow period, which on sensitive crossings will occur between approximately June 15 and September 15, to minimize sedimentation and turbidity induced by high water flow.
- Erosion control measures will be used while constructing pipeline trenches and staging areas, particularly erosion that could lead to increased sediment loads or turbidity in nearby waterbodies. The specific methods used will depend on site conditions such as slope, soil type, and downstream receptors.
- Only straw certified as weed free will be used for mulch and site-specific biotechnical methods of erosion control will be used wherever appropriate. Disturbance of the soil and vegetation will be minimized.
- Vegetative components, alone or in combination with structural and/or mechanical components will be used to stabilize soil. The use of rip-rap to stabilize streambanks will be kept to a minimum and only used in site-specific situations where biotechnical methods of erosion control are not effective. After stabilizing soils with mulch or biotechnical methods of soil and slope stabilization, native vegetation will be planted in denuded areas. Appropriate native perennial plants with strong root structures appropriate for stabilizing streambanks will be selected for this purpose.
- Temporary and permanent runoff diversion structures will be utilized after careful placement planning to minimize runoff to denuded slopes or critical areas. Prompt grading, mulching, armoring, and revegetation will be used to minimize erosion. Sediment

retention ponds will be used where sediment-laden runoff is greater than the capacity that can be controlled by more traditional means (i.e., straw bales and silt fences). Sediment retention devices will be used to filter water pumped from the pipeline trench.

- Slope steepness and slope length will be minimized through the construction of benches, terraces, contour furrows, or diversion ditches.
- Stable road fill will be used to minimize erosion.
- Crossing construction sites will be frequently monitored and inspected to insure that problems will be corrected promptly.

Refueling of Equipment

- All construction equipment will be refueled at least 100 feet from water bodies.
- Equipment refueling or repair will not be allowed in or near the floodplain without adequate provisions to prevent the escape of petroleum products.
- Storing hazardous materials, chemicals, fuels, and lubricating oils, activities will be performed outside the floodplain (at least 100 feet from bank).
- Waste lubricants and solids will be removed from construction sites and be disposed of using Department of Ecology and EPA-approved procedures.

Stream Crossings

- The timing of all construction will consider the migrational periods and rearing conditions of the salmonids. The construction windows establish by WDFW for each county, or special project stream, will be followed.
- Where feasible, the pipeline will be attached to existing bridges at crossing sites to avoid impacts.
- The use of riprap will be minimized to areas where flow conditions preempt vegetative stabilization.
- EFSEC and WDFW will be notified at least 48 hours prior to proposed construction activities within streambeds.
- Crossings will be constructed perpendicular to the axis of the stream channel as engineering and routing conditions permit.
- Downstream flow rates will be maintained at all times.
- Equipment pads, clean rockfill and culverts, or a portable bridge will be used for equipment crossing sensitive perennial streams.
- Instream construction in minor streams will be completed within 24 hours.
- Sediment filter devices will be installed and maintained at all streambanks. The devices will be inspected on a daily basis and repaired as needed.
- Resident fish will be removed from stream crossing areas when blasting is necessary.
- Where possible, existing culverts will not be disturbed. The pipeline will be placed in fill

above existing culverts to prevent construction impacts. Undersized culverts could be blocked by debris flows during winter storms, causing extensive erosion, sediment release into the water channel, and possible damage to the pipeline. Undersized culverts represent a pre-existing risk of sediment release into stream channels. As such, undersized culverts that are identified will be replaced as a pipeline construction mitigation measure.

- Where pre-existing blockages to migration of existing fish populations occurs, modifications to the culverts may be made as a mitigation measure.

Hydrostatic Testing

- The entire pipeline will be hydrostatically tested in accordance with DOT regulations and in compliance with the stipulations of EFSEC regulations regarding water withdrawal and discharge. Pipe installed in rivers will be hydrostatically tested prior to installation. If leaks are detected, they will be repaired or the pipeline section replaced and the section retested.
- All welds to be installed under water bodies or wetlands will receive a 100 percent radiographic inspection.
- At least thirty (30) days prior to use, EFSEC will be provided with a list of specific locations for withdrawals and discharge of hydrostatic test water.
- EFSEC will be notified of the intent to begin using specific sources at least 48 hours prior to testing.
- The intake hose for the hydrostatic test water will be screened (1/8" mesh) to prevent entrainment of fish. The maximum approach velocity will not exceed 12 cm per second.
- Adequate flow rates will be maintained at all times to protect aquatic life and to provide for all other water body uses, including downstream withdrawals.
- When hydrostatic testing is complete, the test water will be analyzed and treated if necessary to make it suitable for discharge in compliance with the water withdrawal and discharge permits issued for the project.
- The water will be detained in ponds or holding areas and discharged to the ground or through filtering media before it enters any watercourse. Erosion protection measures will be incorporated into the water discharge procedures. Final discharge plans will be developed in consultation with EFSEC.
- The water discharge rate will be regulated and energy dissipation devices will be used in order to prevent erosion of upland areas, stream bottom scour, suspension of sediments, or excessive stream flow.

Clearing, Restoration, Stabilization, and Revegetation

- All staging areas, access roads, and temporary access roads will be located at least 100 feet back from the streambank where topographic conditions permit to reduce loss of riparian vegetation and limit the probability that these additional cleared areas will erode.
- Clearing for staging areas for pipeline construction will be confined to the minimum area necessary, and generally are confined to the construction corridor or existing cleared areas away from streams.
- All spoil material from water body crossings will be placed in the right-of-way at least 10 feet away from the riparian zone, or in other EFSEC-approved trenched material storage areas. All sediment will be contained within sediment filter devices.
- Disposal sites that contain cleared slash and overburden will be located in upland areas away from water bodies and will entail the use of runoff control structures.
- Streambanks will be stabilized prior to and after construction by replanting riparian vegetation.
- Clean gravel will be used for the upper one foot of fill over trenches (excavations) in streams.
- Revegetation will be performed immediately after construction using vegetation that is quickly established and native trees for long-term stabilization.
- Black cottonwood (*Populus trichocarpa*) will be planted in locations along the Yakima River, selected with the advice of WDFW biologists, to increase the shade and cover of the middle reaches of this river.
- In rangeland, where heavy grazing by livestock has denuded riparian vegetation and destablized streambanks and channels, revegetated areas will be protected by fencing to permit quick regrowth. Where permitted by landowners, sensitive areas of streambank vegetation can be fenced to restrict livestock access and encourage the regrowth of riparian areas in mitigation for the removal of riparian shrubs and trees at pipeline crossings.
- Log deflectors will be used that create sediment deposition and vegetation establishment to stabilize banks where possible.

1.4.8.9 Priority Species

Mitigation measures proposed for priority plant species and plant communities are:

- Avoid or minimize direct impacts to known areas of occurrence or habitats that may support these species, including soils compaction.
- Implement fire prevention and abatement procedures during construction and maintenance of the pipeline.
- Implement and monitor a plan to control invasive species that may out-compete the

vegetation of concern.

1.4.9 ENERGY

The proposed project is not expected to have a significant impact on energy resources and thus no mitigation measures are proposed.

1.4.10 ENVIRONMENTAL HEALTH

1.4.10.1 Noise

Construction

Mitigation measures during construction operations will include the following:

- Construction will be generally limited to daylight hours.
- All construction equipment shall have sound control devices no less effective than those provided on the original equipment.
- No equipment shall have an unmuffled exhaust system.
- If needed, temporary sound barriers will be used to minimize construction noise if equipment mufflers are not adequate.

Operation

OPL will ensure that noise impacts of the Kittitas Terminal and pump stations remain low. Electrically operated equipment will be utilized at each facility, limiting noise levels substantially.

- OPL proposes to enclose the pump stations that require noise level reductions.
- Ambient noise measurements may be recorded to ensure noise standards will not be exceeded at the pump station locations. If noise levels are found to exceed the standards, appropriate noise reduction methods will be employed.

- At the Kittitas Terminal a simple noise barrier may need to be placed along the west fenceline to mitigate impacts due to the truck loading rack.
- Pump stations will be strategically placed within the property to eliminate noise exceedances at the property border.

1.4.10.2 Mitigation of Risk

- The risk of an explosion at the storage facility will be mitigated by designing, constructing, and operating the facility as required in the latest versions of the applicable codes, regulations, and consensus standards.
- Construction of the storage tanks will follow API recommendations that include venting near the top of the tanks to prevent an accumulation of fuel-air vapors that are required for an explosion to occur.
- An internal floating roof within the fixed roof tank contains a seal to minimize vapors from escaping into the open space above the floating cover and the fixed roof.
- The availability of an ignition source to detonate an accumulated fuel-air mixture will be limited to further reduce the probability of an explosion occurring.
- The facility will be operated by qualified personnel using written procedures. Procedures will provide clear instructions for safely conducting activities involved in all operations of the distribution facility including emergency situations.
- Before being involved in operating the distribution facility, employees will be presented with a facility operations plan, and will receive training regarding the operating procedures and other requirements of safe operation of the facility. In addition, employees will receive annual refresher training, which will include testing of their understanding of the procedures. Training and testing records will be maintained.
- A hazardous materials emergency response program will be implemented for the facility. See Section 2.9 Spill Prevention and Control, and Section 7.2 Emergency Plans.
- The pipeline location will be clearly marked at fencelines and road crossings to minimize risk of third-party damage.

1.4.11 LAND AND SHORELINE USE

1.4.11.1 Land Use

The following mitigation measures will be implemented to minimize project-related impacts on existing land uses.

Construction

- Construction generally will be limited to daytime hours.

- All construction equipment will operate with standard muffler systems.
- Construction areas will be watered as needed to prevent fugitive dust spreading to adjacent land uses.
- Construction on narrow rights-of-way and at or near recreational trails and sites will be continuously controlled to ensure, to the greatest degree feasible, safe and continuous access to recreation areas.

Operation

- A vegetative buffer zone will be placed along the boundaries of the Kittitas Terminal to reduce noise impacts to nearby receptors.
- Pump stations will be placed adequate distances from potential noise receptors, or enclosed, to ensure that noise levels remain low.

1.4.11.2 Visual

Route Planning and Construction

Construction of the pipeline will generally impose temporary visual impacts. Actions already considered to lower impacts to visual resources include:

- Minimize tree cutting and vegetation clearing by routing the pipeline within road and trail right-of-ways, and following existing utility corridors where possible (e.g. BPA). Trail and road users will be impacted, but the impacts will be temporary.
- Stockpile topsoil separately from subsoils and replace over the pipeline after installation to speed regeneration of vegetation using existing seed stock in the soil.

Operation

- Permanent impacts in locations where the pipeline cuts through forested areas can be reduced by creating irregular edges to the corridor to avoid the appearance of a linear swath.
- In specific areas of high visibility like the slope cuts identified in Section 5.1.4.3, adjacent land outside the corridor right-of-way could be acquired for selective cutting to create a larger area for visual patterning.
- Visual impacts will be reduced by planting new, or additional, vegetation around the periphery of the facilities to provide visual screening. A mixture of trees and large shrubs (evergreen, deciduous, etc.) will be used to provide variety of sizes, colors, and textures throughout the year. Planting patterns will be irregular with areas of higher density to avoid a “hedge-row” appearance.

1.4.11.3 Light and Glare

Light and glare impacts are expected to be low. Therefore, no mitigation is proposed for light and glare.

1.4.11.4 Recreation

- During construction, all attempts will be made to keep impacts to recreation facilities to a minimum. Through-access on recreation trails will be maintained as much as practicable.

1.4.11.5 Cultural Resources

Additional study will be conducted to determine National Register eligibility of three sites identified within the project corridor. Furthermore, additional survey work is necessary on approximately 1.9 percent of the route where access was not obtained to provide a complete inventory of the corridor. As a result, site-specific mitigation measures for unsurveyed areas cannot be recommended at this time. The following general recommendations, however, can be made.

- Because pipeline construction could have an impact upon previously unknown cultural resources, construction within archaeologically sensitive areas will be monitored to ensure proper identification, evaluation, and if necessary, mitigation of discovery situations.
- Monitoring will be directed by a qualified archaeologist.
- If cultural resources are identified during construction, the archaeologist will request that construction be halted in the vicinity of the find until necessary steps for evaluation of the significance of the find can be taken and appropriate mitigation actions can be identified, if warranted. The Washington State OAHP will also be contacted at this time.
- In accordance with RCW 27.44, Indian Graves and Records, if a discovered site contains Native American human remains, the monitor will notify the appropriate Tribe and discuss treatment measures with Tribal representatives and the OAHP.
- If the National Register significance of a discovered site cannot be evaluated using available data, an evaluation plan will be developed. Such a plan might include surface collection, archaeological excavation, and artifact analysis.
- If a discovered site is found eligible for listing in the National Register of Historic Places, avoidance will be recommended as mitigation. This is particularly important in the case of Native American human remains. Avoidance may also be the only feasible option for mitigating adverse effects to traditional cultural properties and religious sites. If avoidance is not feasible, a resource plan will be developed for the site. The resource plan will identify site protection measures, data recovery methods, or both.

1.4.11.6 Agriculture

The impact to agricultural lands from the proposed project will be temporary during the construction phase of the project.

Several environmental design features will be incorporated into the project to minimize the impact of construction on adjacent agricultural activities. No additional mitigation is proposed. Environmental design features include the following:

- The proposed pipeline has been routed at the edge of fields and avoids mechanical irrigation circles in almost all cases.
- As part of landowner easements, OPL has agreed to route the line along property or field boundaries to avoid impact to orchards or crops such as asparagus which would have long-term impacts should the pipeline be trenched through the asparagus field.
- To the extent possible, construction will also be timed to avoid going through cropped hay or grass fields. If it is not possible to avoid these fields during the growing season, the payment for easements will also include the expected value of the particular crop for the season lost during construction.
- Wherever feasible, construction activities will occur outside of the planting/growing/harvesting period to minimize cropland productivity impacts.
- Compensation to farmers for crop removal and/or damage or lost productivity caused by the construction activities will be negotiated based on actual impact.
- Following construction, the agricultural lands will be restored to their pre-existing soil types and graded levels, and agricultural activities will be able to resume over the top of the pipeline.
- Compensation to farmers for land permanently removed from productive use by construction of the project will be negotiated based on the productive use of that land.
- Equipment cleaning and washing procedures will be implemented to prevent the spread of noxious weeds.
- OPL will coordinate construction activities with farmers to ensure (1) livestock access to feeding and watering stations, and (2) continued access across the right-of-way for farm equipment.
- After the pipe has been lowered into the trench, the trench will be partially backfilled with excavated soil. The remaining top 8 inches of the trench will be backfilled with topsoil. Compacted soil in the work areas adjacent to the backfilled trench will be loosened by tilling with a disk tiller as part of the right-of-way restoration.
- The pipeline corridor will be replanted with native vegetation or as requested by land owner after completion of construction.
- Fences and gates removed during construction will be replaced.

- A minimum of 4' of soil cover will be placed over the pipeline where deep tilling occurs.

1.4.12 TRANSPORTATION

Mitigation measures that will be employed during construction include the following:

- Workers will be transported to the job site via bus and using state highways and the pipeline access road as much as possible.
- On Kuhn Road, SR 26, and Glade North Road, the pipe will be laid outside of the roadway right-of-way prism in lieu of the middle of the road.
- When trenching across roads, every effort will be made to maintain one lane of traffic through the use of flaggers and steel plates over open trench areas.
- If construction is not complete during work hours, all trenches across public roads will either be backfilled to grade or heavy steel plates will be placed across the trench and the location appropriately marked with warning signs prior to the completion of the days work activities.
- Temporary closures will be planned to avoid peak travel times.
- Security patrols will be provided at each job site to assure the safety of the public and to the contractor's equipment.

1.4.12.1 Parking

- Most pipeline workers will be transported from the construction yard, or directly from their hotels to the job site by bus.
- Only construction-related vehicles will be allowed on the job site.
- Parking areas for construction vehicles will be clearly marked and enforced to protect sensitive areas adjacent to the pipeline construction zone.

1.4.12.2 Movement/Circulation of People or Goods

- In order to ensure safe utilization of the construction areas, pipe staging areas, construction yards, and construction sites (pipeline) will be patrolled by security personnel.

- The pipe staging areas and construction yards will be fenced.
- At the pipeline, open trenches through roadways will be covered during all non-construction hours.
- During construction, the public will generally not be allowed access to the pipeline right-of-way. Only land owners and the pipeline owner will have access to the right-of-way.
- After construction is completed, the roads will be returned to preconstruction standards unless otherwise agreed upon by the land owner or agency with jurisdiction over the road.

1.4.12.3 Traffic Hazards

Mitigation measures for construction are as follows:

- State highways will be utilized as much as is practical for transporting of pipe segments from the pipe staging areas to minimize impacts on local roadways.
- Pilot vehicles will be used where necessary to assist pipe distribution trucks negotiate curves and hills in mountainous regions.
- Boring pits will be constructed as far from the traveled way as is possible and the boring sites will be protected with concrete barriers to prevent accidents if required for a specific site.

No mitigation measures are proposed for operation as no impacts are expected to occur.

1.4.13 PUBLIC SERVICES AND UTILITIES

The overall impact to most public services and utilities is expected to be minor and short-term. Mitigative measures for project-related impacts are described below:

- Construction activities will be coordinated with local police and fire departments, and emergency medical service providers to ensure access to all locations along the pipeline route in the case of an emergency.
- Stringent construction health and safety measures will be enforced to reduce the potential for accidents, particularly during the welding phase.
- To help mitigate loss of access and other traffic related impacts, adequate traffic control and signage, indicating closures and alternate routes, will be provided.
- Construction vehicle trips in and out of the immediate construction zone will be coordinated and scheduled away from "rush-hour" periods, to minimize general traffic disruption.
- Noise and dust problems generated by construction will be mitigated through the use of properly muffled construction equipment, and by the use of approved dust control methods.
- During construction, precautions will be used to ensure that excavations do not damage underground utilities.
- During construction, all attempts will be made to keep impacts to recreation facilities to a minimum. Through-access on recreation trails will be maintained as much as practicable.
- During operation, the pipeline will be buried in a clearly marked right-of-way to reduce the chance of accidental third party damage.
- The Kittitas Terminal will have a fire detection and suppression system. OPL will only

expect responding fire personnel to establish a safety perimeter around that facility and manage access and evacuation if necessary until terminal staff arrive.

- OPL will enter into local agreements with the vicinity fire departments for training, additional response materials, or other needs to perform this limited function.
- The Kittitas Terminal will have a security system.

1.4.14 SOCIOECONOMICS

The socioeconomic effects of the proposed action will be predominately beneficial, in the form of temporary increases in jobs, personal income, and sales taxes during the construction phase. On any large project, the winding down of construction work can have a depressive effect upon some community economies which have built up business activity in support of the project, but it is unlikely in this case, because of the project's short duration and mobile worksites. The magnitude of each spread's work relative to the scope and depth of economic activity in the surrounding areas is unlikely to be large enough to be destabilizing. No mitigating measures are therefore recommended.

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